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ABSTRACT

The North Carolina Community College System engaged in a strategic planning process in 1998 that was the basis for the information resources and technology plans for the entire System. A focus of the planning was technology, and a technology environmental scanning team developed a set of planning assumptions, which led to the creation of 15 goals and related objectives for the 1999-2001 biennium. The technology-related planning assumptions included: (1) increasing the use of technology to redefine delivery systems; (2) using technology to better serve business and agency partners; (3) providing more technology training; (4) developing a communication infrastructure to support distance learning and remote access to resources; (5) redefining the funding model for technology and technical staff; (6) using technology to reach underserved customers; and (7) reducing administrative, regulatory, and accrediting barriers to the effective use of technology at the colleges. Technology-related goals arising from these assumptions include: (1) acquiring and maintaining the resources to support the educational objectives of the System; (2) creating an integrated, systemwide virtual learning environment; and (3) providing and supporting state-of-the-art administrative systems to integrate the colleges electronically. This document discusses the implementation of these goals and the costs involved. Appendices contain a steering committee strategic directions report, a library automation system request for proposals, and equipment plans. (EMH)

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North Carolina Community College System Information Resources and Technology Plan

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North Carolina Community College System
Information Resources and Technology Plan

I. Introduction

II. Strategic Plan

III. Information Systems for the Future Project

A. Plan for an Efficient and Effective Technology and Management Information System for the North Carolina Community College System
B. 1999-2001 Budget Request

IV. Library Resources and Automation System

A. Library Resources Funding Study
B. Library Automation System

V. Distance Learning

A. NCCCS Virtual Learning Community
B. 1999-2001 Budget Request for Distance Learning

VI. Community College Equipment Needs

VII. Information Services Responsibilities, Goals, Objectives and Projects

A. Key Responsibilities
B. Key Goals and Objectives for 1998-99
C. Major Information Systems Projects
D. System Office Equipment Procurement Plan

Appendix A: Strategic Directions Report of the Steering Committee of the "NC Community Colleges Administrative Systems for the Future"

Appendix B: Library Automation System Request for Proposals

Appendix C: 1998-99 through 2000-2001 Equipment Plan

North Carolina Community College System
Information Resources and Technology Plan

I. Introduction

State Board of Community Colleges requires that the community colleges develop technology plans as a part of their institutional effectiveness planning process. The Department of Community Colleges develops information resource and technology plans that support the entire system of 59 institutions. This overview includes the planning assumptions, goals, and objectives developed through a system-wide strategic planning process as well as the separate plans that address each of the three major goals. Included is also the department's plan for providing ongoing maintenance and support of the applications software for the colleges and upgrading computer equipment in the System Office.

The Department of Community Colleges provides centralized information technology support to the 59 institutions in the system. Three sections provide direct support of information technology and resources to the colleges: Information Services, Library Resources, and Telecommunications (Distance Learning). In addition, the Division of Business and Finance supports the acquisition of equipment and technology.

II. Strategic Plan

The North Carolina Community College System engaged in a strategic planning process in 1998 that is the basis for the information resources and technology plans for the entire system of 59 institutions and the department. A focus of the planning was technology, and a technology environmental scanning team developed a set of planning assumptions. Using the planning assumptions from all six environmental scanning teams, the Planning Council developed fifteen goals and related objectives for the 1999-2001 biennium. The strategic plan was adopted by the State Board on June 19, 1998, and the budget request submitted by the Department of Community Colleges was aligned with the strategic plan.

Technology Planning Assumptions

1. Increased use of technology by our customers will require that community colleges redefine delivery systems.

2. Community colleges must increase their use of technology to enable effective partnerships with those businesses and agencies that have not been sufficiently served in the past.

3. The increasing demand for people with technology expertise in supporting current equipment requires that community colleges provide more technology training on up-to-date equipment.

4. The increasing demand for connectivity between community colleges, homes, public schools, businesses, and external resources requires NCCCS to develop the

communication infrastructure to support distance learning and remote access to resources.

5. The funding model for technology and technical staff at community colleges must be examined and redefined to support the increased demand for and reliance on technology for instructional and administrative functions.

6. Community colieges must increase the use of technology to reach under served customers.

7. NCCCS must work to reduce administrative, regulatory and accrediting barriers to the effective use of technology at the colleges.

Strategic Goals and Objectives

The North Carolina Community College System's 1999-2001 Strategic Plan[1] includes the following technology-related strategic initiatives and goals:

Goal 3: Acquire and maintain the facilities, equipment and learning resources to support the educational and training objectives of the community college system.

3.1 By 2001 establish a four-year replacement cycle of instructional equipment and technology.

3.2 By 2000 expand access to information resources for workforce preparation by identifying resources beyond ***NC LIVE*** and developing a plan for acquisition of those resources.

Goal 14: Create an integrated, system-wide virtual learning environment.

14.1 By April 1999 revise policies to remove barriers to distance learning and develop a consensus plan and supporting budget request for organizing the *NC virtual learning community*.

14.2 By December 1999 provide centralized support for virtual learning for community colleges.

14.3 By September 2000 begin delivery of instruction through the *NC virtual learning community*.

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[1] Approved by the State Board of Community Colleges, June 19, 1998; copy available at: http://www.ncccs.cc.nc.us/planning/open2.htm

Goal 15: Provide and support state-of-the-art administrative systems to integrate the North Carolina Community College System electronically.

15.1 By 2001 implement the first phase of the *new administrative computing systems*.

III. Information Systems for the Future Project

The Information Systems for the Future project has developed a plan for implementing Goal 15 to "Provide and support state-of-the-art administrative systems to integrate the North Carolina Community College System electronically." The State Board of Community Colleges approved the following recommendation from the Steering Committee:

> Based on the Project Management Team's evaluation of the alternatives, purchasing, customizing and implementing an integrated information system that includes a student information system, financial information system and human resources system; developing a System-level operational data base and a data warehouse, and integrating and supporting specialized systems such as voice response, etc. as required will be the most effective strategy to meet the North Carolina Community College System's requirements for administrative systems.

On February 2, 1999, the Community College Information Systems for the Future project was presented to the North Carolina Information Resources Management Commission (IRMC) for approval. The material provided to the IRMC members included an IRM Initiative Review Sheet[2], a Project Concept document[3] and Project Proposal Checklist[4]. The IRMC approved the project as recommended by the IRM staff.

The report prepared for the General Assembly and the supporting budget request follow. Appendix A contains the executive summary from the Steering Committee.

A. Plan for an Efficient and Effective Technology and Management Information System for the North Carolina Community College System

To comply with Senate Bill 1366, Section 10.6, this plan for an efficient and effective technology and management information system for the North Carolina Community College System was approved by the State Board of Community Colleges on January 15, 1999. In accordance with the provisions of S.B. 1366, Section 10.6, the approved plan is submitted to the Joint Legislative Education Oversight Committee.

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2 Available at: http://www.ncccs.cc.nc.us/~blackmun/sasf/IRMC-299.pdf

3 Available at: http://www.ncccs.cc.nc.us/~blackmun/sasf/Concept.pdf

4 Available at: http://www.ncccs.cc.nc.us/~blackmun/sasf/chcklist.pdf

Executive Summary[5]

The attached report provides detailed information as to how the Department of Community Colleges will provide a modern, efficient information system that will support both the administrative operations of the 59 institutions and the management information needs for the colleges as well as the department. The system-wide study has involved personnel in all functional areas of the colleges. The recommendation for a new integrated information system results from the finding that the current system is inadequate to meet today's needs and that a major overhaul to prepare the system for the next century is not feasible or economical.

The Department must secure adequate funding in this session for one-time purchase and development of software and for ongoing support for maintaining and upgrading. The data warehouse is a major new item to support management reporting and decision-making, analysis and research using historical data. The data warehouse and reporting systems are essential for responding to the legislature and to all other customers, prospective business clients, and other agencies requiring reports on the community colleges.

While the report explains the management information systems in some detail, staff in the department can provide concrete examples of how the system will improve operations at the 59 institutions and the reporting capabilities of the department. The real issue is the value of accurate and consistent data from all 59 institutions for reporting and accountability. Without this investment in a new information system, more of the community colleges will find it necessary to contract with independent vendors for new software, and reporting on the system will become more difficult with non-standardized systems in place. Presently there are two community colleges whose needs are not adequately met by the administrative software provided by the Department, and the costs of the software, the additional staff, and the inability to provide data immediately as often is required to respond to special requests can not be measured. This investment in the long run will save the State funds through a single management information system that serves the needs of all 59 institutions and the Department.

The presidents of the 59 institutions have unanimously and repeatedly supported the primary goal and assumption of the project: to acquire, implement and support an integrated information system that meets the needs of all of the institutions. The presidents recognize not only the benefits of such an information system being used by all of the institutions, but also the nearly overwhelming cost and effort that would be required for each college to install and support individual information systems that meet statewide needs and requirements. The two community colleges that have found it necessary to have separate information systems (because the current system did not meet their needs in the past) have been strong advocates of the new information system and are fully committed to early adoption.

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[5] The complete report to the General Assembly is available at: http://www.ncccs.cc.nc.us/reports/legis/info_sys.pdf

Summary of Key Points of the Plan

1. In 1997 the Department of Community Colleges initiated a system-wide process to evaluate alternatives and develop plans for enhanced or new administrative computing systems. This initiative was in response to the North Carolina Community College Association of Presidents and the Association of Community College Business Officers. Over 300 community college personnel have been directly involved in identifying needs for an enhanced information system. The process has received input and support from the 58 community colleges for replacing the existing administrative information systems and adding a management information system.

2. The State Board of Community Colleges has approved a recommendation to purchase and customize an integrated information system. The recommendation is based upon a thorough evaluation of needs and of vendor responses to a Request for Information.

3. To implement the recommendation, the State Board of Community Colleges approved the 1999-2001 Expansion Budget request that includes $25 million in each year for Phase 1 of the information systems project and funding for college information technology support needs.

4. In preparation for the bid process, the Department of Community Colleges is preparing detailed specifications for a formal Request for Bids in the spring of 1999 to provide cost and implementation information. The Department of Community Colleges will use the new "Best Value in Information Technology Procurement" to insure that the new information system is the best solution for the colleges and the Department.

5. The benefits of this project include improving the administrative operations of the 58 colleges through enhanced software applications and providing for the first time a management information system for both the colleges and the Department to use for planning, research, and reporting. A single software license for all 58 community colleges will be significantly less expensive in both direct purchasing costs and ongoing human resources required for maintenance and support. Furthermore, this solution will address the needs of the General Assembly for consistent, accurate, and timely data from the Department of Community Colleges through standardization of all 58 community colleges data systems and the new data warehouse to support management information.

B. 1999-2001 Budget Request

	1999-2000	2000-2001
System Office	$15,137,000	$$15,189,800
College Requirements	$10,529,087	$10,529,087
Total	**$25.7 Million**	**$25.7 Million**

IV. Library Resources and Automation System

A. Library Resources Funding Study

Goal 3 of the strategic plan includes the acquisition of library resources to support the 59 institutions. As a part of Phase 4 of the North Carolina Community College System's Funding Formula Study[6], a comprehensive study of the existing library book funding formula and funding level was conducted. This study identified key issues:

- Base Cost - The new formula needs to address what base level of funding a community college needs for its instructional resources budget, regardless of its enrollment size;
- Adequacy of Funding - The new formula needs to set funding targets designed to provide an adequate level of state appropriations
- Expanded Program Delivery Methods - The new formula should no longer be as closely identified to the book entitlement concept, and instead be intended to provide for all types of instructional resources.

One component of the analysis was a survey conducted in the Fall, 1998 of the 58 community colleges. The survey identified funding needs by category and purpose, as shown below.

Instructional Resource Needs by Categoy					
Category	Enhance Functions at Main Library	Enhance Functions at Off-Campus Library Locations	Enchance Curriculum Instructional Support	Enhance Distance Learning Instructional Support	Total Estimated Cost
Line/Access Charges	$ 76,781	$ 21,292	$ 300	$ 33,873	$ 132,246
Maintenance Contracts	90,399	9,762	5,769	12,509	118,439
Equipment / Hardware	2,607,576	553,425	475,473	117,905	3,754,379
Electronic Formats / Licenses	680,073	159,412	15,204	48,223	902,912
Media (Print and Non-Print)	18,625,877	1,621,856	1,103,170	156,480	21,507,383
Other	808,991	23,093	40,931	1,932	874,947
Software	274,200	68,506	18,140	22,305	383,151
Total	$ 23,163,897	$ 2,457,346	$ 1,658,987	$ 393,227	$ 27,673,457

The funding study integrated this survey information with a statistical analysis of library expenditures vs. FTE students and also an estimate of funding requirements based on the Association of College and Research Libraries (ACRL) standards for community colleges. The conclusion of the analyses is that an annual appropriation of $6.5 million is required, which is nearly $2 million greater than the sum of current recurring and non-recurring appropriations.

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6 Funding Formula Study: Phase 4 Report, North Carolina Community College System, Feb. 4, 1999

B. Library Automation System

An addition to the funding formula study, the new library automation system is a major component of the plan for the acquisition of library resources to support the 59 institutions.

In 1995, 36 community colleges established a consortium to establish a shared library automation system to serve the needs of the member colleges and the Library Resources Services section of the Department of Community Colleges. The system is currently operated under a contract with Ameritech Library Systems, with the costs shared by the member community colleges. Since the service provider agreement must be re-bid every three years, the member colleges have decided to seek bids for a permanent software license and a maintenance and support service agreement from the software vendor. The system will utilize leased equipment. The information in Appendix B is part of the Request for Bids document for this system.

V. Distance Learning

A. NCCCS Virtual Learning Community

The Distance Learning Council of the North Carolina Community College System recommended to the North Carolina Community College Presidents Association the establishment of a distance learning consortium to address Goal 14 of the strategic plan: "Create an integrated, system-wide virtual learning environment." The Presidents Association approved the recommendation at its July 1998 meeting, and all 58 community colleges agreed to participate in the consortium. A steering committee with two presidents from each of the six trustees regions was established to work on the plan for the virtual learning community. The following executive summary from the steering committee was presented and approved by the Presidents Association at the January 1999 meeting. The concept and supporting budget are evidence of accomplishment of the first objective under Goal 14.

Executive Summary

The Concept

The North Carolina Community College System (NCCCS) Virtual Learning Community (VLC) is a consortium of colleges which collaboratively develop and offer Internet-based courses following common policies and guidelines. The goal is to provide easy access and quality distance learning instruction for students in a cost-effective manner through the sharing of resources.

The Course Library

VLC courses will be selected from the Common Course Library and Master Course List and converted into Internet-based courses. These courses may be offered at any time. Conversion of the courses will be done by faculty teams which will design course templates that include competencies, content, and resource materials but which also provide for some local flexibility. Courses will be interactive and incorporate effective distance learning methodologies. Course

development will begin with Internet-based courses already offered by VLC members, and additional courses will be added following a time frame to be developed. All courses will be evaluated regularly and revised as needed.

The Delivery System

The delivery system selected will be an open standards Internet-based system that is affordable and easy to use. It will support student interaction in a variety of modes, accommodate multimedia materials developed locally and commercially, and be scaleable to meet present and future needs.

Student Services

To facilitate student access to courses in the VLC, common student services policies and procedures will be developed. These include admissions and registration, tuition and fees, financial aid, transcripts, and advising. Access to library resources will also be addressed.

Implementation

Four work teams with representatives from member colleges will recommend how to implement the Virtual Learning Community. The teams and their charges are:

- Work Team 1: Identify and recommend a common delivery system.
- Work Team 2: Select course templates and oversee the course development process.
- Work Team 3: Recommend policies and procedures to facilitate student access and support the delivery of courses among members of the VLC; propose marketing plan.
- Work Team 4: Establish training programs for instructors and technical staff.

The Distance Learning Consortium will oversee the work of the four teams.

B. 1999-2001 Budget Request for Distance Learning

Description

Create an integrated, systemwide virtual learning program, including funds to support a system office staff and the delivery of instruction, and technical and instructional resources to colleges. The request assumes the establishment of video rooms using the "Information Highway," Internet access and support, a central office support infrastructure, course content development, and instructional delivery.

Elements

Interactive Video

Establish 38 video rooms over two years, pay line charges at 60 sites, employ 60 site coordinators, and provide a base level of support for each site.

Internet

Provide web servers, NCIIN data access, network technicians, and other expenses at each of the 60 sites.

Central Support & Service

Provide a "help desk" and network support staff (6 FTE) and operating expenses.

Content Development

Develop 300 courses/year for three years. Instructors would have paid release time for three years. Development of 12 regional courseware centers, including equipment and software.

Instructing

Provide additional support staff for colleges, resource materials, and operating expenses for each college.

Cost

	1999-2000	2000-2001
Infrastructure		
Interactive Video	$ 4,237,000	$ 5,320,000
Internet	$ 4,680,000	$ 4,680,000
Central Support	$ 775,000	$ 775,000
Instructional		
Content Development	$ 450,000	$ 450,000
Delivery	$ 3,660,000	$ 3,660,000
TOTAL VIRTUAL COLLEGE:	**$13.8 Million**	**$14.89 Million**

VI. Community College Equipment Needs

If community colleges are to help provide the employers and employees of this state with the knowledge and skills demanded by the technology forces which influence the economy of today and tomorrow, colleges must integrate more state-of-the-art instructional equipment into the teaching and learning associated with all programs provided. This effort needs to recognize the replacement life cycle of equipment. Multiple-year replacement cycles are needed in some areas, based upon the useful life of the equipment. Further enhancement of the newly established "Equipment Reserve" is requested in the 1999-2001 budget for the North Carolina Community Colleges. Additionally, funds are needed to purchase new equipment heretofore not available.

In 1997, a survey was conducted of equipment needs of the community colleges. The results of that survey indicated a total outstanding need of $131 million. Of this amount, $54 million, or 41%, was identified in computers and related technology needs. An analysis of the total equipment inventory of the community colleges indicates that computers and related equipment comprise approximately 48% of the total equipment inventory.

The 1998 session of the General Assembly established an equipment reserve fund. To access those funds, colleges must submit equipment acquisition plans that are approved by the State Board of Community Colleges. As of February 1999, 29 community colleges have submitted equipment acquisition plans. These plans include the following amounts:

	1998-1999	1999-2000	2000-2001	Total
Technology-related	$6,941,925	$1,880,380	$143,382	$8,965,687
All Equipment	$7,990,483	$2,964,453	$ 162,382	$11,117,318
Technology-related as % of total	86.9%	63.4%	88.3%	80.6%

The very high percentage of technology-related equipment purchases clearly reflects the high priority that the community colleges give to these acquisitions.

VII. Information Services Responsibilities, Goals, Objectives and Projects

The Information Services section of the Department of Community Colleges provides direct services to the 59 institutions in the system. Its purpose is to enable the system to utilize effectively information technology in delivering services to students, faculty, and staff. Each year the Information Services section develops a work plan with specific objectives. The following includes the 1998-99 annual goals and objectives, a description of long-range projects, and a computer equipment procurement plan for the Department of Community Colleges.

A. Key Responsibilities

1. To design, develop, and implement college administrative software information processing systems (Institutional Information Processing Systems, IIPS); and, to train and provide technical support to college personnel on the use of those systems.
2. To design, develop, and implement NCCCS administrative hardware information systems and to train and provide technical support to NCCCS personnel on the use of those systems.
3. To design, develop, and implement state-level data processing systems to receive, process, report on and manage college data on students, FTE, staff, finance, equipment, and to coordinate data NCCCS data collection for other agencies.

4. To operate and maintain system office computing hardware and software resources to support IIPS software development, information processing, and office automation. To provide technical support to system office personnel on their use.
5. To develop an information communications network that links together all colleges, the system office, and other systems for the purpose of electronic information interchange.

B. Key Goals and Objectives for 1998-99

1. Improve upon service levels to all customers on systems under the responsibility of the system office Information Services (IS) by full implementation of the adopted Systems Development Life Cycle process.
2. Assess and restructure the IS section to best implement the System Development Life Cycle processes.
3. Recruit sufficient personnel resources to enable the IS to effectively meet responsibilities. Specific needs identified:

    i. Software Quality Control/Release Management Specialist
    ii. Technical Support/Training Specialist - IIPS Systems
    iii. Applications Analyst Programmer (4 positions)
    iv. Systems Programmer - Unix
    v. Documentation Specialist
    vi. Database Administrator
    vii. Internet Technician
    viii. Database Programmer

4. Complete the migration of all college and system office applications off the Prime computer system.
5. Develop and pilot a plan to migrate the NCCCS off the PI/Open DBMS to Universe DBMS.
6. In concert with the President's Association, develop information technology standards for the NCCCS, e.g., e-mail.
7. Develop plans for improving technology support for colleges, e.g., networks, Groupwise, Unix systems administration, exploring new delivery mechanisms such as regional centers, distributed system office staff.
8. Assist in the development of an RFP and implementation planning for Administrative Information Systems for the Future.

C. Major Information Systems Projects

Student Centered Information Systems: Making the student the center of focus by developing appropriate information systems that are responsive to the needs and demands of today's students. The concept is to provide direct student access to services via electronic means, e.g.,

1. Internet-based application
2. Internet-based registration

3. Internet-based financial aid processing
4. Internet-based class schedules
5. Electronic transcripts
6. Internet-based books and materials purchasing
7. Telephone and Internet access to grades
8. Telephone registration for continuing education students
9. One-Stop Shopping wherein a citizen can access many government resources at one place, including Community College training and education programs

This will be a series of projects requiring 2-2.5 man-years of work.

Enhancements to the Administrative Systems Financial Applications: Several major enhancements to the current financial applications are planned including:

1. Automate 1099s (w/tapes)
2. Implement the bar code scanning system at the System Office
3. Automate encumbrances adjustments for mass deduction changes
4. Provide ability to do automated encumbrances for full-time salaries
5. Automated Receipts and Deposits Transfer System
6. Automate processing and posting of tuition refund credits to student records.

These enhancements will require 0.5 -0.75 man years of work.

Develop a College Facility Management System: Develop a fully integrated college facility management system to enable automated class scheduling, facility usage monitoring and reporting, and other facility management functions. This is estimated to require 0.4 to 0.5 man years of work.

Respond to Legislative Mandates: Develop appropriate information system to meet required legislative mandates such as:

1. Hope Scholarship / Lifelong Learning Tax Credits reporting.
2. High School Drop-out Prevention Act.
3. Reporting New-hires under the Deadbeat Dads Act.
4. High School Tech-Prep student performance reporting.

Collectively these projects will require 1.0 man years.

Migrate NCCCS Database Management System to SQL-Compliant Technology: SQL-compliant database technologies will extend the ability of the NCCCS to move from operational applications to decision support systems. The migration will be a major project requiring 2-3 man years of work.

Upgrade the NCCCS System Office Networking Infrastructure: Through an upgrade to the local area network infrastructure, move the system office into a position to enable it to have voice/video/data service to each desktop. (See the computer equipment plan, below, for procurement details.)

D. System Office Computer Equipment Procurement Plan

The 1998 Budget includes $105,000 in additional funds for the Department of Community Colleges to replace outdated computer equipment. The primary use of these funds is to acquire desktop computers on a three year replacement cycle. Since this is being done through a lease-purchase, the remaining funds in 1998-99 and 1999-2000 are being used to upgrade the internal data network equipment, printers and related computer equipment.

	1998-1999	1999-2000	2001-2001
87 Desktop computers - 3 yr. Lease	$43,500	$43,500	$43,500
87 Additional desktop computers (3 yr.)		$43,500	$43,500
36 Additional desktop computers (3 yr.)			$18,000
Upgrade & replace network equipment, printers, etc.	$61,500	$18,000	$ 0
Total	$105,000[7]	$105,000	$105,000

[7] An additional $56,208 from the equipment budget is also allocated to the purchase of computer equipment in 1998-99, for a total of $161,208 as shown on the spreadsheet (Appendix C).

APPENDIX A

Strategic Directions Report of the Steering Committee of the "NC Community Colleges Administrative Systems for the Future"

Executive Summary[8]

In April 1997, the System President appointed a Steering Committee for the "North Carolina Community Colleges Administrative Systems for the Future." The project grew out of the needs identified by the Technology Committee of the President's Association, survey results from the North Carolina Association of Community Colleges Business Officers' (NCACCBO) Management Information Systems Committee, and the North Carolina Community College System Office's "Information Technology Planning Study Report."

The Steering Committee's mission is to

- define and communicate the case for improving the administrative systems for the North Carolina Community College System;
- establish a vision that ties together the system's academic needs and aspirations with a proposed financial, student and business systems architecture;
- develop a set of planning principles that will help define the scope and character of the project as well as provide the means to evaluate its outcomes; and
- establish, through an assessment of various tradeoffs, the high-level scope, boundaries and priorities of the project(s).

Since the work of the Steering Committee is of vital concern to the NCCCS, the Committee regularly consults with local college staff and with statewide associations. Progress reports are given to the Presidents' Association and other regional and statewide meetings.

After the initial meeting of the Steering Committee on April 18, 1997, focus group meetings were scheduled regionally across the state to get input from the entire system. The goal of the focus groups was to ascertain the participants' views of (1) the present state of administrative systems and (2) the future needs for administrative systems.

The focus group data were summarized and served as the basis for developing a vision statement for administrative systems for the future and planning principles to use in evaluating the key outcomes of the process. The Steering Committee's vision statement is as follows:

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[8] The complete Strategic Directions Report #2 is available at: http://www.ncccs.cc.nc.us/~blackmun/sasf/strgrpt6.pdf

The comprehensive, fully integrated administrative system of the 21st century will support student-centered learning, management decisions, accountability to external constituencies, and business operations for all community colleges through a flexible, seamless electronic network that is accessible to all.

The Steering Committee used the planning principles and focus group data to develop a gap analysis. The gap analysis compares the present state of administrative systems with the desired future state of administrative systems. The gap is the difference between present and desired systems and thereby indicates the changes necessary to improve the administrative systems.

The Steering Committee appointed the Project Management Team on December 5, 1997. The Project Management Team's responsibilities are

- to oversee the needs identification process;
- to develop a requirements document and seek a solution; and
- to recommend an administrative system solution congruent with the vision statement and the requirements articulated from the gap analysis.

The Steering Committee and the Project Management Team met jointly on December 11-12, 1997, at Guilford Technical Community College to hear presentations from several of the vendors that develop administrative software systems nationally. The vendors represented one or more examples of alternatives of buying software, building new software, or partnering with a vendor to develop a software solution. These sessions gave the joint group examples of how each of the approaches could work and was extremely valuable in making subsequent recommendations.

During January and February 1998, the Project Management Team appointed functional sub-groups to assist in assessing the need for any changes in the business operations of each functional area (for example, human resources) that may impact on the future administrative systems.

Based on the identified needs for changes in the operations of the community colleges, the Project Management Team developed a Request for Information (RFI) to

- provide information for decisions by the Steering Committee on the best combination of "build," "buy" and "partner" solutions for meeting the administrative systems needs;
- provide information on the feasibility and estimated costs of potential "build," "buy" and "partner" solutions for use in developing funding proposals; and
- identify potential vendors/partners for subsequent Request for Bids.

Eight vendors provided information in response to the RFI. The Project Management Team evaluated these responses based on the following alternatives:

1. Purchase and implement an integrated administrative system that includes a comprehensive

student information system, financial information system and human resources system; develop a system-level operational data base and a data warehouse.

2. Purchase and implement an integrated information system that includes comprehensive financial and human resources systems, and a student information system that provides opportunities for significant customization; develop a system-level operational data base and a data warehouse; integrate and support specialized systems, such as voice response, as required.

3. Purchase a system that includes advanced technology with comprehensive financial and human resources systems and basic student information systems that will be significantly enhanced and customized; develop a system-level operational data base and a data warehouse; integrate and support specialized systems, such as voice response, as required.

4. Purchase integrated financial and human resources systems and continue to develop and support student information systems that are integrated via middleware; develop a system-level operational data base and a data warehouse; integrate and support specialized systems, such as voice response, as required.

5. Information Services staff use available technology to develop and support information systems that are integrated and designed to meet the specific requirements of the NC Community College System; develop a system-level operational data base and a data warehouse; integrate and support specialized systems, such as voice response, as required.

The evaluation of these alternatives used the analysis of the functional teams in considering major themes and the current and planned capabilities for each functional area.

Conclusion and Recommendation

Based on the Project Management Team's evaluation of the alternatives, purchasing, customizing and implementing an integrated information system that includes a student information system, financial information system and human resources system; developing a System-level operational data base and a data warehouse, and integrating and supporting specialized systems such as voice response, etc. as required will be the most effective strategy to meet the North Carolina Community College System's requirements for administrative systems.

The advantages of this strategy include the following:

- The purchased system is fully integrated and supported by a single vendor. The vendor's ongoing maintenance and enhancements will be similarly integrated.
- The systems use reasonably stable technology (equipment and software).
- A large number of customers, including community colleges, use these systems.

The recommended strategy reflects the Project Management Team's conclusions:

- Outdated systems have created the need for a "quantum" leap in functionality.

- Insufficient staff resources are available to build a system from scratch or to partner with a vendor to build a new system and to support internally developed systems.
- Colleges are able to change their operations sufficiently to match available vendor solutions.
- Time frame required for completing implementation is too aggressive to be met by internal development.
- Fully integrated administrative systems are essential.
- The gap between system-wide vision and off-the-shelf vendor solutions is manageable.

The primary limitation of the recommended strategy of purchasing administrative software is that the systems will require customization and possibly some modifications during the implementation to meet the mandated requirements of the NC Community College System, and such modifications would require ongoing maintenance and support in addition to that provided by the vendor. These systems may require changes to existing operating procedures, workflows, etc. as part of the implementation.

Because of the size and complexity of the NC Community Colleges System, the vendors are generally unable to provide detailed estimates of the time required to implement the systems. It appears likely that three to five years will be required for all colleges to move to new software. The Project Management Team will evaluate alternatives and recommend specific implementation strategies and timetables during the 1998-99 year.

The cost estimates provided by the vendors, plus costs associated with development of a system-level data base to provide shared data across community colleges and data warehouse(s), indicate that the total cost will be $25 - 35 million for implementation (non-recurring) and $5 - 7 million annually (recurring) for maintenance and support. Since a major portion of the implementation cost is the software licensing and customization, it is likely that two-thirds to three-quarters of the total cost will be incurred in the first two years, with the balance incurred in the second two years.

During the fall, 1998, the Project Management Team members, working with functional working groups, developed detailed plans and specifications to address the following issues:

- Implementation Plan & Schedule
- Detailed requirements and specifications for software acquisitions
- Strategies and plans for training and support
- Develop and implement plans to assess and upgrade college information technology infrastructure.

The results of the Project Management Team's work will enable the System Office to obtain bids for administrative software systems in the spring, 1999. The bids will be based on the "Best Value in Information Technology Procurement" legislation (HB 1357 of the 1998 session).

The Community College System's 1999 - 2001 Expansion Budget proposal (that will be considered by the 1999 Legislative Session) includes approximately $15.1 million in each fiscal

year for the costs for acquiring, customizing and implementing Phase 1 of the college information systems and system-wide data warehouse. Completion of the bid process will provide specific cost and timetable requirements in support of the 1999 - 2001 Expansion Budget request.

APPENDIX B
Library Automation System Request for Proposals

Scope of Project: Introduction

Purpose

The specific purpose of this Request For Bids (RFB) is to enable the North Carolina Community College System (NCCCS) to acquire an easy-to-use online integrated library system. The integrated library system must provide tangible, day-one benefits for faculty, students, and staff within the NCCCS and ensure the enhancement of library services, procedures, and products.

The RFB will provide information for decisions by the Library System Contract Team on the choice of a library system to meet our defined needs and provide information on costs and timelines of potential systems for use in developing funding bids and implementation plans.

Background

The North Carolina Community College System

The NCCCS is comprised of 59 autonomous community colleges. The System's oversight is the duty of the N.C. State Board of Community Colleges, and its administrative support arm is the System Office.

The mission of the North Carolina Community College System is to open the door to high-quality, accessible educational opportunities that minimize barriers to post-secondary education, maximize student success, and improve the lives and well-being of individuals by providing:

- Education, training and retraining for the workforce, including basic skills and literacy education, occupational and pre-baccalaureate programs.
- Support for economic development through services to and in partnership with business and industry.
- Services to communities and individuals which improve the quality of life.

Library Resources Services

Library Resources Services (LRS) is a unit of the System Office's Division of Administration. LRS manages a centralized library automation system, CCLINC, currently used by 40 of the 59 NCCCS member institutions. In addition, LRS provides centralized technical services and consultation on library issues for all 59 institutions.

Library Resources Services mission statement: Committed to customer service and dedicated to acting as a catalyst for positive change, Library Resources Services provides leadership to the 59 institutions and the System Office through policy development, coordination of planning and assessment, development of information and reporting systems, negotiation and brokerage of goods and services, and technical assistance for libraries. Functions include planning, integrated technical services, collection management, training, and information technology for libraries.

LRS' centralized technical services consist of an integrated acquisitions/cataloging team which processes approximately 60,000 items per year. Items ordered by LRS on behalf of the colleges are received centrally, and the items and invoices are processed and forwarded to the colleges. Bibliographic records are supplied from OCLC or original cataloging, initial holdings records are created, and items are shipped to the member libraries for bar coding. LRS has responsibility for overall maintenance of the CCLINC database, although member libraries maintain their own holdings records after initial creation.

LRS statistics:
12 staff
28,858 items ordered fiscal 1997-98
60,225 items cataloged fiscal 1997-98

The Centralized Library Automation System, CCLINC

LRS provides machine-readable bibliographic records to the constituent libraries of the NCCCS by copy and original cataloging utilizing OCLC. All of the community colleges have automated library systems.

The current centralized library automation system, shared by 40 of the 59 constituent libraries, is a Data Automation Center (DAC) running Ameritech Library Services' Dynix Release 172. The centralized project is named CCLINC, which stands for "Community College Libraries in North Carolina." The system is provided through a *service agreement* between Ameritech and the State Board of Community Colleges, whereby Ameritech provides on-site hardware and software (including upgrades), maintenance, on-site training, after-hours emergency phone support, and a full-time, on-site Ameritech employee for system administration services. LRS manages the system as agent for the State Board. A cooperative agreement "defines the relationships to the Data Automation Center (DAC) among the participating North Carolina community colleges, their Learning Resources Centers, and the North Carolina Community College System state office."

The executive arm of the CCLINC group is its Steering Committee, with representation by each of the constituent groups which are party to the cooperative agreement. CCLINC serves as a shared union catalog for the 40 independent member libraries, many with one or more branches. Bibliographic records are shared. Holdings and patron records are maintained separately by each library, but may be accessed by all users. Interlibrary loan transactions are

initiated directly by patrons as well as staff and are filled system-wide. Each member library has a separate account for each module that it uses. This enables functions and activities to occur both system-wide and at the local level.

Each of the libraries participating in CCLINC uses the Dynix Cataloging, Circulation, and PAC modules. Additionally, one or more of the libraries use each of the following modules: Acquisitions, Serials, Reserve Book Room, Media Scheduling, and Community Resources. LRS uses Cataloging and Cataloging for Windows and is currently implementing Acquisitions. A separate on-site server provides access to WebPAC, and individual libraries may also install and use PAC for Windows. The standard barcode format is Codabar, 13 digits plus check digit, as defined by Ameritech Library Services.

CCLINC statistics:

773,083 bibliographic records (mostly MARC)
1,397,203 item records (non-MARC)
168,716 patron records
305,819 items circulated fiscal 1997-98
10,998 local and interlibrary holds filled, fiscal 1997-98
300 concurrent users, of which approximately 125 are staff users

Note: as an artifact of the original data conversion and migrations, there is a significant amount of duplication among the bibliographic records. An ongoing project in fiscal year 1998-99 aims to reduce the duplication rate. The item record count will not be reduced.

Definition of an Integrated Library System

For purposes of this RFB, a fully integrated library system is defined as an automated library environment in which:

- Links between functions are seamless and transparent to the user;
- All transactions occur in real time:
- Data is entered once for operation within multiple applications; and
- Actions completed in one function must inform or create in other functions.

The state-of-the-art system will economically support and provide access to all public services. These will include, but are not limited to, bibliographic access (including hypertext links), document delivery, and full-text, image, sound, video, and other multimedia electronic resources.

The system will also support collection management, administrative processes, and technical services functions related to both locally-owned and externally-accessed resources. It will take advantage of new and emerging technologies to raise the level of library services and operations.

Minimum System Requirements

This RFB is predicated on the premise that any future NCCCS library system will retain all currently stored data, maintain present levels of functionality, and offer improvements and enhancements to both the state of the database and the operations of the system. The system will support both MARC and non-MARC formats for existing and future records.

An overriding factor to be considered in all responses is that a system must support the global and local needs of a multi-library, cooperative environment where processes are performed at central, local, and branch levels. The system must enable individual libraries to have some degree of localized flexibility in response to their unique needs, while maintaining global mechanisms to ensure integrity of both data and functionality.

The system must be a complete system, including but not limited to the hardware, applications software, installation mechanisms, database loaders, training, documentation, maintenance, support, and ongoing software enhancements necessary to provide easy-to-use, online, real-time, integrated automated support for the functions outlined in the specifications below.

From a design standpoint, the system should have the following characteristics indicating a state-of-the-art product:

- *standards-based*, including but not limited to USMARC; Z39.50 (Information retrieval); Z39.58 (Common command language); Z39.63 (ILL Data elements); EDI (Electronic data interchange).
- *open*, defining both the architecture and its underlying protocols. Software should be written in an upper-level language and be machine-independent.
- *functional*, with an integrated approach to library processes that permits data to be input once and applied universally. Easy-to-use, efficient interfaces should provide mechanisms for the import and export of data and data records among system components and with outside, commercial vendors and utilities.
- *network-friendly*, with a level of technology which allows interactivity with networks already in place locally, regionally, and nationally, particularly the State of North Carolina's ITS network. The technology should work across network architectures.
- *virtual*, capable of interacting with other resources in such a way that a seamless, transparent system is created for the user no matter where data and functionality are located.
- *future-looking*, with a planned approach to the development and incorporation of improvements and an ability to stay abreast of changes in the field of library services.

APPENDIX C

1998-99 through 2000-2001 Equipment Plan

Equipment and Software - Projected for FY98/99	Number	Projected Unit cost	Total Cost	Reason for need	Priority	Projected 1999-2000	Projected 2000-2001
Cabletron Smartswitch 10baseT	1	$44,000	$44,000	To add ethernet ports to the basement, 1st and 5th floors and upgrade ethernet LAN toward switched technology	1		
Winng - 5th floor		$12,500	$12,500	Provide additional network ports for 5th floor computer lab & offices	1		
Lantronics Remote Access Server - two port	1	$1,000	$1,000	Provide remote access to the system office network	2		
Printronix Line Printer - 450LPM	1	$8,500	$8,500	Replace the 1985 printronix system	2		
Data center Operations Subtotal:			**$66,000**			**$0**	**$0**
HP 5xx printers	9	$1,500	$13,500	Replace selected HP 2xx and HP 3D series network printers with printers that can support network management software-hp Direct	2		
Personal Computers -**Leasing** option	87	$500	$43,500	Replace all 486 desktop PCs that are out of warranty and not capable of running windows 95. **If PCs are purchased, then we can only replace 20 of the 76 machines that need to be replaced this year.**	1	$43,500	$43,500
Personal Computers -**Leasing** option	87	$500		Lease 87 additional computers in 2nd year.		$43,500	$43,500
Personal Computers -**Leasing** option	87	$500		Lease 36 additional computers in 3rd year.			$18,000
Laptop Computers	4	$2,100	$8,400	For assignment to system office divisions	2		
Scanner	2	$280	$560	Expressed need of the organization	2		
LCD Projection Unit	2	$5,000	$10,000	One installed in the training center, One for general purpose use	2		
Contingency -Equipment	1	$2,000	$2,000		2	$ 18,000	
Subtotal - System Office Equipment:			**$77,960**			**$105,000**	**$105,000**
Microsoft Office 97	200	$41	$8,148	To upgrade the system office office automation application with the currnet versions compatible with 32bit architectures	1		
Office furniture	11	$600	$6,600	To equip offices for 11 new positions			
Misc. Software	1	$2,500	$2,500	To upgrade the system office office automation application with the currnet versions compatible with 32bit architectures	1		
Subtotal - software, system office			**$17,248**			**$0**	**$0**
	Total		**$161,208**			**$105,000**	**$105,000**

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